for **Peabody Midwest Mining LLC**
Bear Run Mine
Carlisle, Indiana

Second Monitoring Month
July 14 – August 13, 2012
Particulate & Meteorological Monitoring Summary
Bear Run Mine

August 23, 2012
MMA Project Number 2507-11

by McVehil-Monnett Associates, Inc.

44 Inverness Drive East, Building C
Englewood, CO 80112
(303) 790-1332

Table of Contents

List of Figures

List of Tables

Appendices

1.0 Introduction

Consistent with the Dust Monitoring Plan (DMP) approved by U.S. EPA Region V pursuant to the Agency's Section 114(a) request for information dated November 17, 2011, Peabody Midwest Mining, LLC (PMM) is submitting this report documenting PM_{10} and meteorological monitoring for the period from July 14 through August 13, 2012 at PMM's Bear Run Mine. PM_{10} data are provided in Section 3 while meteorological data are provided in Appendix A. PMM commenced monitoring of PM_{10} on June 14, 2012.

Air quality and meteorological data are being collected at the sampling locations in the project area depicted in Figure 1 in the DMP. Continuous PM_{10} beta attenuation monitors (BAMs) collect data at three sites identified as 1, 2, and 3. A Tisch federal reference method (FRM) PM_{10} sampler also operates at Site 1. Meteorological monitoring instrumentation is located at Site 3. The locations of these sites are shown in Figure 1 in the DMP.

2.0 Air Quality Station Performance Summary

2.1 Notable Project Events

PM_{10} monitoring and data collection generally proceeded smoothly during the second monitoring month. No calibrations or audits were completed during this monitoring period.

2.2 Missing and Invalid Data

The one issue resulting in missing and invalid data for the Site 3 BAM federal equivalent method (FEM) PM_{10} sampler is listed in Table 2-1.

Table 2-1
Missing Particulate Data
Bear Run Mine
July 14 - August 13, 2012

Date	Problem Encountered	Missing Data/ Dates
8/7/12	Site 3 BAM failed leak check. Problem was fixed on August 8 with the instrument resuming proper operation at 1100 EST.	Site 3 BAM 7/31 1000 EST to 8/8 1100 EST

2.3 Network Data Completeness

2.3.1 Second Monitoring Month (July 14 - August 13, 2012)

Data recovery for the Tisch FRM sampler was 100.0% for samples collected on the national 1-in-6 day schedule. Monthly data recovery rates for the continuous BAM PM_{10} units at Sites 1 and 2 were each 100.0%. The monthly data recovery rate for the BAM PM_{10} unit at Site 3 was 71.0%. Data recoveries for the second monitoring month are listed in Table 2-2.

2.3.2 Monitoring Program (June 14 - August 13, 2012)

These data recoveries for the first two months of the monitoring program exceed the 75% standard for particulate sample collection listed in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, US Environmental Protection Agency, EPA-454/B-

08-003 and in the project Quality Assurance Project Plan (QAPP). Data recoveries for the first two months of the monitoring program are listed in Table 2-2.

Table 2-2
Data Recovery Rates
Bear Run Mine
June 14 - August 13, 2012

Sampler	July 14 - August 13 Monthly Data Recovery (%)	June 14 - August 13, Data Recovery (%)
Tisch PM_{10} Sampler Site 1	100.0	90.9
BAM PM_{10} Monitor Site 1	100.0	100.0
BAM PM_{10} Monitor Site 2	100.0	100.0
BAM PM_{10} Monitor Site 3	71.0	85.2

2.4 Calibrations

During the second monitoring month, no calibrations were completed. The next calibrations of the Tisch FRM sampler and the three BAM PM_{10} units are scheduled for early September.

2.5 Performance Audits

During the second monitoring month, no performance audits were completed. The next audits of the Tisch FRM sampler and the three BAM PM_{10} units are scheduled for late August.

2.6 Field Blank

The results of the monthly field blank for the Tisch FRM PM_{10} sampler are provided in Appendix B.

3.0 Air Quality Monitoring Data Summary

The highest 24-hour average PM_{10} concentration for the monitoring period was 83 µg/std.m^3 measured on August 7 at Site 2. The second highest 24-hour average PM_{10} concentration of 67 µg/std.m^3 was measured on July 23 at Site 2. The 24-hour National Ambient Air Quality Standard (NAAQS) for PM_{10} is 150 µg/std.m^3.

The average measured concentrations for the monitoring month for the Tisch FRM sampler at Site 1 was 28.7 µg/std.m^3. The average measured concentrations for the monitoring month for BAM instruments at Sites 1, 2, and 3 were 35.8 µg/std.m^3, 39.0 µg/std.m^3, and 29.1 µg/std.m^3, respectively. PM_{10} concentrations for the monitoring month are summarized in Table 3-1.

PM_{10} concentration results for the Tisch FRM sampler are presented in Table 3-2. Average daily PM_{10} concentrations for each BAM instrument are presented by site in Table 3-3. All daily PM_{10} concentrations were calculated from measurements taken from midnight to midnight local standard time.

Table 3-1
Airborne PM_{10} Concentrations
Bear Run Mine
July 14 - August 13, 2012

Site/Monitor	Highest 24-Hour Concentration (µg/std.m^3)	Percent of NAAQS*	2nd Highest 24-Hour Concentration (µg/std.m^3)	Percent of NAAQS*	Monthly Mean Concentration (µg/std.m^3)
Site 1 Tisch	55	36.7	34	22.7	28.7
Site 1 BAM	64	42.7	58	38.7	35.8
Site 2 BAM	83	55.3	67	44.7	39.0
Site 3 BAM	54	36.0	42	28.0	29.1

* NAAQS = National Ambient Air Quality Standards. The 24-hour standard for PM_{10} is 150 µg/std.m^3.

Table 3-2
BEAR RUN MINE
Project # 2507-11

PM_{10} Particulate Filter Data Log

Site 1 – Tisch FRM Sampler

Monitoring Month July 14 - August 13, 2012

Completed: 8/21/12

Calibration Dates And Results:			06/14/2012	m= 7.4605	b= 0.4715								
Sample Date	Filter No.	Manometer Average (in. H2O)	Avg. Ambient Temp. (K)	Avg. Ambient Press. (mm Hg)	P1/Pav	Qa (act. m^3/min)	Qstd (std. m^3/min)	Sample Time (min)	Std. Volume (std.m^3)	Tare Weight (g)	Gross Weight (g)	Net Weight (mg)	Std. PM10 Concen. (ug/std.m^3)
7/14/2012	273708	18.25	298.1	748.80	0.954	1.118	1.101	1441.2	1587	4.5986	4.6171	18.5	12
7/20/2012	273709	18.72	298.6	746.10	0.953	1.116	1.093	1441.2	1575	4.6218	4.6568	35.0	22
7/26/2012	273710	18.42	303.2	741.20	0.954	1.125	1.079	1441.2	1554	4.6131	4.6659	52.8	34
8/1/2012	273712	17.68	300.9	744.50	0.956	1.126	1.092	1440.6	1573	4.5896	4.6364	46.8	30
8/7/2012	273713	19.18	300.2	746.50	0.952	1.116	1.088	1441.2	1568	4.6070	4.6925	85.5	55
8/13/2012	273714	18.13	293.4	745.30	0.955	1.109	1.105	1441.2	1592	4.6139	4.6437	29.8	19

Comments: Temperature and barometric pressure data obtained from Site 1 BAM.

Table 3-3
Daily PM_{10} Concentrations Measured by the BAMs
Bear Run Mine
July 14 - August 13, 2012

Date	Site 1 24 hr. avg. ($\mu g/std.m^3$)	Site 2 24 hr. avg. ($\mu g/std.m^3$)	Site 3 24 hr. avg. ($\mu g/std.m^3$)
7/14	12	15	13
7/15	23	33	30
7/16	36	49	27
7/17	47	64	41
7/18	49	54	41
7/19	40	44	33
7/20	27	23	18
7/21	25	23	37
7/22	27	37	36
7/23	39	67	54
7/24	53	57	40
7/25	39	55	42
7/26	36	47	18
7/27	41	65	26
7/28	25	15	13
7/29	31	17	25
7/30	36	30	41
7/31	41	42	64
8/1	35	22	21
8/2	36	36	42
8/3	23	28	32
8/4	32	46	33
8/5	24	22	18
8/6	40	36	21
8/7	58	83	32
8/8	55	66	31
8/9	29	22	22
8/10	26	18	16
8/11	38	18	11
8/12	64	51	33
8/13	23	25	25

Shaded cells contain invalidated data. These values are excluded from the monthly statistics presented in the text.

4.0 Meteorological Station Performance Summary

4.1 Notable Project Events

Meteorological monitoring and data collection proceeded normally during the monitoring month. No calibrations or audits were completed during this monitoring period.

4.2 Missing and Invalid Data

All data collected during the monitoring period are valid.

4.3 Network Data Completeness

Data recoveries for this reporting period exceed the 90% standard (Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV, Version 2.0 (Final) US Environmental Protection Agency, EPA-454/B-08-002, March 2008) with perfect recovery rates of 100.0% for each parameter. Data recoveries for the reporting period are summarized in Table 4-1.

4.4 Quality Control and Quality Assurance

4.4.1 Calibrations

During the second monitoring month, no calibrations on the meteorological instruments were completed.

4.4.2 Performance Audit Results

During the second monitoring month, no performance audits were completed. The next audits of the meteorological instruments are scheduled for mid October.

Table 4-1

Data Recovery Rates
Bear Run Mine Meteorological Station
July 14 - August 13, 2012

Parameter	July 14 - August 13		Monthly Data Recovery Rate (%)	Required Data Recovery Rate (%)
	Valid Hours	Possible Valid		
Wind Speed	744	744	100.0	90.0
Wind Direction	744	744	100.0	90.0
Temperature 2-meter level	744	744	100.0	90.0
Barometric Pressure	744	744	100.0	90.0
Precipitation	744	744	100.0	90.0

5.0 Meteorological Monitoring Data Summary

5.1 Wind Analysis by Hour of the Day

For the reporting period, the standard wind frequency distribution is presented graphically in Figure 5-1 and in tabular form in Table 5-1. The predominant wind direction for the period was from the south-southwest, occurring 16.2 percent of the time. The secondary maximum was from the south, occurring 10.2 percent of the time. (Note: The commercial software used to produce graphs uses a starting wind speed threshold different than that of the project wind sensors.)

The mean wind speed for the monitoring period was 5.7 miles per hour (mph) as shown in Table 5-1 (or 2.5 meters per second as shown in Figure 5-1). The direction with the highest mean wind speed of 7.7 mph was north-northwest, while the lowest mean wind speed of 3.7 mph was measured for winds from the northeast.

5.2 Temperature Data

The maximum hourly average temperature for the monitoring period of 100.8°F was recorded for hours 1600 and 1700 EST on July 25. The minimum hourly average temperature for the monitoring period was 52.7°F measured on August 12 for hour 0700 EST. The maximum, minimum, and average values for the monthly ambient temperatures are shown in Table 5-2.

5.3 Barometric Pressure Data

The mean barometric pressure for the monitoring period was 29.34 inches of mercury.

5.4 Precipitation Data

During the monitoring month, 0.82 inches of precipitation were measured. The day with the greatest measured precipitation was August 13 with 0.22 inches recorded. The maximum amount of precipitation received for a one-hour period was 0.12 inches, which occurred during hour 2400 EST on July 24. The precipitation data for the monitoring period are summarized in Table 5-3.

Table 5-1

10-Meter Wind Data Analysis
From 7/14/2012 through 8/13/2012
Bear Run Mine Meteorological Station

Frequency of Occurrence of Wind Speed by Direction

	+----------WIND SPEED CLASSES (MPH)----------+							
DIR	0.0-4.0	4.0-7.4	7.4-12.1	12.1 18.8	18.8 24.6	> 24.6	TOTAL	AVERAGE WIND SPEED
N	.0190	.0255	.0108	.0000	.0000	.0000	0.055	5.2
NNE	.0150	.0349	.0161	.0013	.0000	.0000	0.067	6.0
NE	.0203	.0134	.0000	.0000	.0000	.0000	0.034	3.7
ENE	.0203	.0148	.0000	.0000	.0000	.0000	0.035	3.8
E	.0149	.0161	.0000	.0000	.0000	.0000	0.031	4.0
ESE	.0204	.0349	.0027	.0000	.0000	.0000	0.058	4.5
SE	.0311	.0309	.0054	.0000	.0000	.0000	0.067	4.6
SSE	.0285	.0390	.0148	.0000	.0000	.0000	0.082	5.1
S	.0231	.0605	.0188	.0000	.0000	.0000	0.102	5.4
SSW	.0246	.0780	.0497	.0094	.0000	.0000	0.162	6.9
SW	.0096	.0309	.0228	.0040	.0000	.0000	0.067	6.9
WSW	.0082	.0228	.0188	.0027	.0000	.0000	0.053	6.5
W	.0068	.0148	.0054	.0013	.0000	.0000	0.028	5.9
WNW	.0163	.0296	.0027	.0013	.0000	.0000	0.050	5.0
NW	.0163	.0242	.0202	.0013	.0000	.0000	0.062	6.2
NNW	.0041	.0202	.0202	.0013	.0000	.0000	0.046	7.7
TOT:	0.278	0.491	0.208	0.023	0.000	0.000	1.000	
AVG:	3.0	5.5	9.0	13.5	0.0	0.0		5.7

Total Number of Valid Readings for this Table => 744
Out of 744 Total Valid Hours
Total Number of Missing Hours => 0
Total Number of Calm Hours => 2

Table 5-2
Monthly Temperature Extremes - 2-Meter Level
Bear Run Mine Meteorological Station
July 14 - August 13, 2012

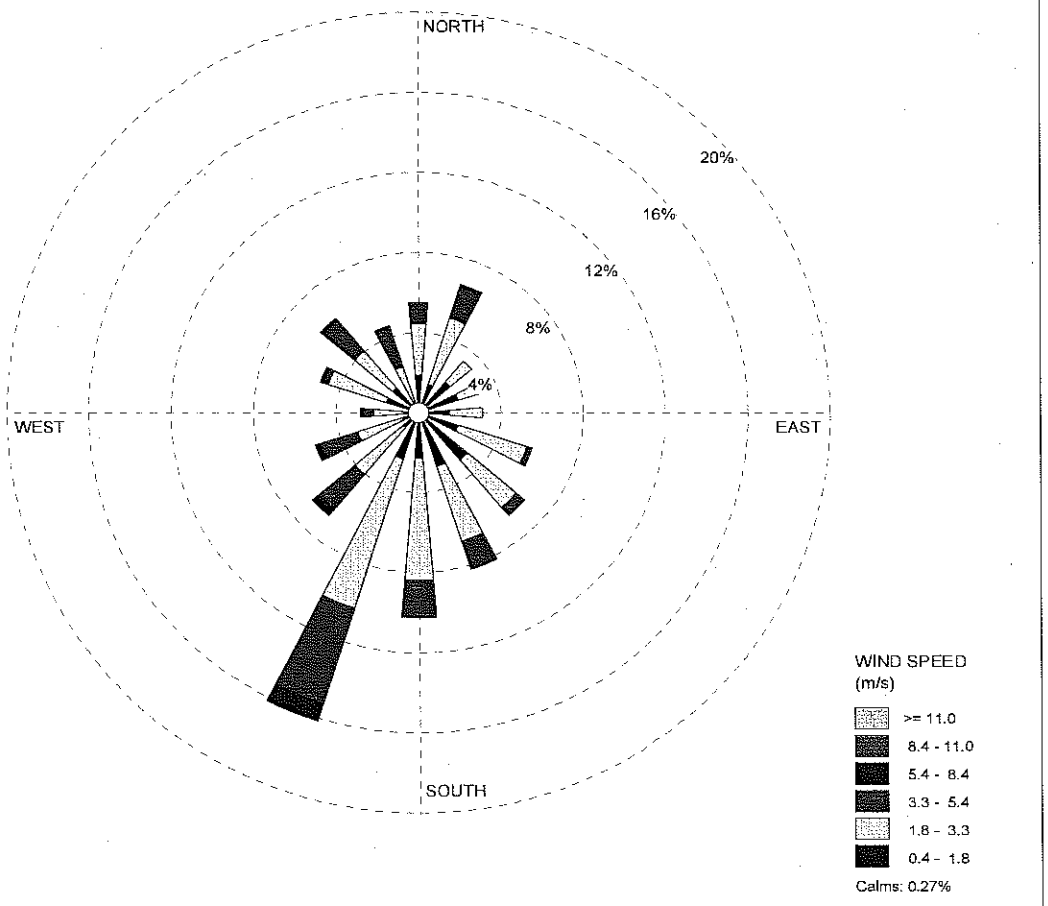
Maximum Hourly Average (°F)	Mean Daily Maximum (°F)	Minimum Hourly Average (°F)	Mean Daily Minimum (°F)	Mean (°F)
100.8	91.0	52.7	68.4	79.6
Maximum hourly average temperature of 100.8°F recorded on July 25 for hours 1600 and 1700 EST.				
Minimum hourly average temperature of 52.7°F recorded on August 12 for hour 0700 EST.				

Table 5-3
Precipitation Data Summary
Bear Run Mine Meteorological Station
July 14 - August 13, 2012

1-Hour Maximum (inches)	Daily Maximum (inches)	Total for Monitoring Period (inches)
0.12	0.22	0.82

Bear Run Mine
Site 3 Meteorological Data

DISPLAY:
Wind Speed
Direction (blowing from)



DATA PERIOD: **2012 Jul 14 - Aug 13 00:00 - 23:00**	COMPANY NAME: **Peabody Energy**	
	MODELER: **McVehil-Monnett Associates**	Figure 5-1
CALM WINDS: **0.27%**	TOTAL COUNT: **744 hrs.**	
AVG. WIND SPEED: **2.54 m/s**	DATE: **8/23/2012**	PROJECT NUMBER: **2507-11**

WRPLOT View - Lakes Environmental Software

6.0 Conclusions

This document summarizes the results for the second month of the Bear Run Mine air quality and meteorological monitoring program.

PM_{10} concentrations remained well below the requisite NAAQS. Particulate monitoring data recovery rates for the first two monitoring months range from 85.2% to 100% for the four PM_{10} samplers.

Meteorological data recovery rates were 100.0% for all meteorological parameters at the Site 3 meteorological station.